

भारत सरकार **GOVERNMENT OF INDIA**  
रेल मंत्रालय **MINISTRY OF RAILWAYS**  
(रेलवे बोर्ड **RAILWAY BOARD**)

2014/M(C)/165/1 part III Vol II

New Delhi, dtd. 13.06.2018

**Director General,  
RDSO / Lucknow.**

**The Principal Chief Mechanical Engineers,  
All Indian Railways.  
ICF, RCFK, MCF.**

**Sub: Report of High Powered Committee (HPC) constituted by Hon'ble SC's order dated 04.07.2017 against WP(C):178/2014: Abhay Singh vs Ministry of Railways and others.**

The report of HPC (with ED/Carriage/RDSO as convenor) in subject case was submitted to Board. On perusal, Board (MRS) has desired that following 2 recommendations of HPC should be implemented with immediate effect by PUs, ZRs & RDSO:

- A. Recommendation No.5: *It is recommended by the committee that random testing of material supplied by the firm should be done by the PUs/Railways to ensure the compliance of specification at every six months for all the items and incase, non-conformity is noted, firm should be delisted for a minimum period of two years in order to discourage firms for supplying non-conforming materials.*
- B. Recommendation No.8: *It was observed that the test results obtained at CIPET Hyderabad are not in line with CPRI due to some procedural lapses although test was conducted on same sample. Hence, the test results of CIPET, Hyderabad cannot be taken into cognizance. The possibility of these procedural lapses cannot also be ruled out in case of testing at NITRA, Ghaziabad where the same sample got tested by the petitioner Sh. Abhay Singh. The doubt arises as the lab did not provide the detailed breakup of the concentration of each gas produced during combustion of the test specimens. The committee recommends that the additional corrective measures as detailed at Annexure - XXIV may be adopted during Toxicity testing as per NCD 1409 so as to ensure accuracy and reliability in the test results of toxicity conducted by the NABL accredited labs including RDSO.*

May please ensure compliance.

DA: Annexure XXIV of HPC Report (3 pages)

  
13-6-18

(Navaid Talib)  
Director Mech. Engg.(Chg.)  
Railway Board.

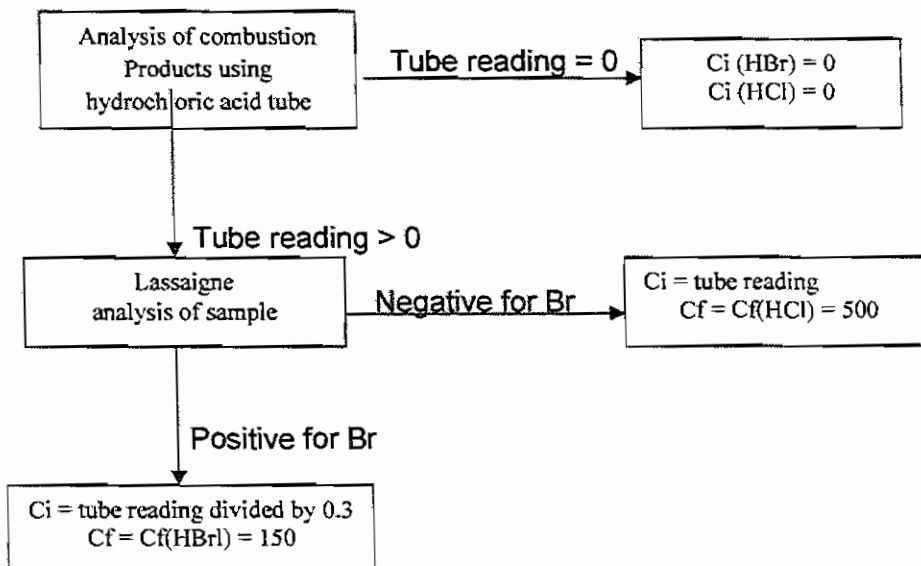
**ADDITIONAL CORRECTIVE MEASURES TO BE ADOPTED DURING TOXICITY TESTING AS PER NCD 1409**

1. Clean the walls of the chamber thoroughly with tissue papers before starting the test as well as for determination of background correction factor so that the possibility of interference of other toxic elements already deposited on the walls of the test chamber through adsorption or condensation can be avoided.
2. It is known that for some gases, the indicator chemicals in the tubes have a cross sensitivity to gas species other than those that they are designed to measure. Where appropriate, the possibility of such interferences shall be stated in the test report, but no attempt shall be made to take account of these interferences in the calculation of the Toxicity Index. (An exception to this is the measurement of HBr).
3. In order to avoid the ambiguity in case of PVC based material, the analysis of halide gases shall be carried out first in order to minimize potential losses through adsorption, condensation, etc which is also brought out in NES 713 standard clause 10.2.16 which is parent standard of NCD 1409. Further sampling of gases shall be as follows HF, HCl, HBr, Phosgene, C<sub>6</sub>H<sub>5</sub>OH, SO<sub>2</sub>, H<sub>2</sub>S, HCN, CH<sub>2</sub>CHCN, HCHO, CO, CO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub>.
4. For measurement of Hydrogen Bromide (HBr) using Colorimetric Gas Reaction Tubes the following procedures shall be followed.
  - a. There are currently no colorimetric gas reaction tubes available that are specifically designed to measure hydrogen bromide (HBr). However, some types of tube that are designed for measurement of other gases, are known to give a reading in the presence of HBr, although with a different measurement sensitivity.
  - b. The hydrochloric acid tube supplied will give a reading in the presence of HBr, but with measurement sensitivity from approximately 1 to 0.3 times that for HCl. In some cases, HNO<sub>3</sub> tubes are also used to detect HBr.
  - c. If this hydrochloric acid tube gives a zero reading, this may be taken to indicate that HBr (as well as HCl) is not present in the combustion products.
  - d. When this hydrochloric acid tube gives a non-zero reading, it is necessary to distinguish whether the reading is due to HCl, or to HBr, or

to a mixture of both of these gases. This may conveniently be achieved by undertaking a separate elemental analysis of the material under test. The "Lassaigne" sodium fusion test is a cost effective and convenient method that has been used for this purpose, but other analytical techniques may be used. This will determine whether or not the material contains bromine (Br) and therefore whether its combustion products could contain HBr.

- e. If the material does not contain Br, then the reading on the tube is due to HCl only and the value indicated on the tube can be used in the normal way, directly as the concentration ( $C_i$ ) of HCl in the test chamber.
- f. If Br or both Br and Cl are present in the material, then the least favourable case (highest possible value of  $C_8$ ) would be given by treating the reading on the tube as if it were all due to HBr. HBr has the lower  $C_f$  value ( $C_f(\text{HBr}) = 150$ ,  $C_f(\text{HCl}) = 500$ ) and the tubes are up to (approximately) three times less sensitive to HBr, than they are to HCl, for which the scale on the side of the tube is calibrated. It is therefore necessary to divide the concentration value indicated on the tube by 0.3 and use the figure obtained as  $C_i$ , for HBr, to calculate a value of  $C_8$  for HBr. A worst case Toxicity Index contribution ( $C_8/C_f$ ) is then calculated using the  $C_f$  value for HBr.
- g. A flow chart for measurement of hydrogen bromide (HBr) using one type of hydrochloric acid gas detection tube is given as under.

Example of process for measurement of hydrogen bromide (HBr) using one type of hydrochloric acid gas reaction tube



5. For low density materials (e.g. foams) for which 4 gm test specimen would be too large to be engulfed in the burner flame, reduce the size/mass of specimens, to ensure that this can be achieved. Use the largest possible specimens that will allow this requirement to be met. Do not crush or otherwise distort the specimen in order to achieve this condition.
6. A thermocouple shall be available duly calibrated with an accuracy of  $\pm 3^{\circ}\text{C}$  suitable for measuring the temperature of the burner flame having a temperature of  $1150 \pm 50^{\circ}\text{C}$  at its hottest point.
7. Gas sampling shall be done only one at a time (as specified in the RDSO standard) even though gas reaction tubes are pre-installed in the flexible tubings connected to the chamber and are closed at the entry of the chamber with possible clip arrangements. It is not necessary that tubes are to be inserted one at a time into the chamber for gas sampling which consumes more time and may result in losses through condensation and adsorption.

The above corrective measures are based on Defence Standard 02-713, Issue 3 (copy placed as **Annexure XV**)